



Smart First-Aid Kit and Medicine Planner for Impaired People

Moshe Rani, Dr. J Rajeswar Goud, P Santhosh, Venkanna Babu

Department of ECE, Hyderabad Institute of Technology and Management, Hyderabad, India

To Cite this Article

Moshe Rani, Dr. J Rajeswar Goud, P Santhosh, Venkanna Babu, Smart First-Aid Kit and Medicine Planner for Impaired People, International Journal for Modern Trends in Science and Technology, 2024, 10(03), pages. 168-172. <https://doi.org/10.46501/IJMTST1003025>

Article Info

Received: 02 February 2024; Accepted: 26 February 2024; Published: 03 March 2024.

Copyright © Moshe Rani et al;. This is an open access article distributed under the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Now a day's technology is running with time, it completely occupied the life style of human beings. It is being used everywhere in our daily life to fulfil our requirements. In developing countries such as India, where population and health maintenance is a major concern, new alternative solutions for health parameters are being introduced. The process of seeing a doctor for routine check-ups is a long time as well as a financial burden. So, to overcome this we introduce a smart first-aid kit which provides us with a temporary treatment. It is a kit in which all the types of medicines are available which can act as a self-treat through diseases like cold, cough and other few types of disease. Sometimes a situation occurs that a patient needs temporary treatment so at that time it can help him/her to relax for at least time in which he/her can reach the nearest hospital. At the same time in this project we provide smart medicine box (SMB). SMB will help people, especially blind and elderly people to pre-sort their medication for the day. The system consists of two sub-systems which are dispensing and alerting systems. Dispenser System (DS) is to fill pills manually into the Smart Medicine Box (SMB) by manually and the alerting is designed to remind the user of dosages time. The technology that is used to interact with the user is based on voice interaction system since it is the easiest way to communicate with elderly and blind people. Once the patient puts her/his medicine into the container, the SMP will take care of saving medicine information, dispensing and reminding the user. Shortly, the project will focus on two major areas which are providing Smart first-aid kit and voice interactions, combing the dispensing and alarms systems in one device.

Keywords— Pillbox; IR Sensor; Arduino Microcontroller; GSM Module; Real time clock.

1. INTRODUCTION

Technological innovation is changing the way patients are receiving care services. Nowadays, Smartphone's are not only the key computing and communication mobile devices, but an ensemble of embedded sensors that collectively enable new applications in many areas such as homecare, healthcare, social networks, safety,

environmental monitoring, ecommerce and transportation. Today in healthcare systems, the utilization of mobile devices is becoming more and more frequent. Indeed, mobile technology is playing important role in chronic disease management, empowering the elderly and expectant mothers, reminding people to take medication at the exact time,

extending service to underserved areas, and improving health outcomes and medical system efficiency. Mobile phones are not only powerful and rich in features but also less costly due to advances made in various technology domains. Besides primary use of personal communication and entertainment, it can also interestingly used in various health and Wellness monitoring applications. The proliferation of multi-touch interface, multimedia, enhanced computing also strong embedded system offers easy to use smart phones like iPhone, HTC Touch, etc. And hence smart phone and mobile internet usage can be used as rapid growth all around the world starting from past few years. Empowering user friendly design as well as intuitive usage, those devices can be used by everyone even by disabled and elderly patients. In our day to day life, due to busy schedule and workload, people often forget to take their medicines on time. Especially, old aged people having illnesses and who are illiterate have problem while taking the medicine, and sometimes it's not possible for the family members to give them medicine at prescribed time. There might be chances of them taking wrong medicines because of poor eyesight. It is also possible that they might take extra dosage of same medicine, so this may lead to another medical condition which is not desirable. In order to stabilize their health condition they need to take right medicines at the right time.

2. MOTIVATION

The main motivation of this project is to design, a 'HEALTH CARE SYSTEM' for the disable people and elder people who lives independently, to take care about themselves individually. And also to provide SMART FIRST- AID KIT' to the people who lives in the rural areas, to prevent the escalation of illness or injury. And also we motivated, based on some real incidences happening in rural areas until now

3. RELATED WORK

Several different pill box were available in the market. The cheapest one was the traditional pillbox, which contained seven boxes for seven different days of a week, costing around 200 rupees. However, user had to load the pills to the boxes every week. Mixing different pills in the same box would increase the risk of making mistakes. We also found another type of pillbox, which

had the sound reminder, and was able to remind the user to take medicine at user specified time. However, the users still have to put different kinds of pills in the same box, and reload the boxes every week. Additionally, it could only remind the user to take pills once a day. The average costs of this type of pillbox were about 1000 INR, Therefore, we think it was necessary to build a cheap and functional smart Medicine Box that could bring more convenience for the user. [6] We then defined the specifications of our device based on the user needs. From the literature cited, the research proposed an idea of Smart Medicine Box [9]-[10] that will adapt the features of time tracking and alarm triggering. Additionally, as compared to the existing system, It will remind the user to take medicine not for once per day but thrice per day along with that user does not need to refill the box every week.

4. MAJOR COMPONENTS USED

The project entails a simple electronic reminder system comprising of the following components:

Real time clock, Arduino Uno, Arduino IDE, IR sensors, Buzzer, GSM Module, LCD Display, Pill Box, connecting wires, jumper wires, and breadboard.

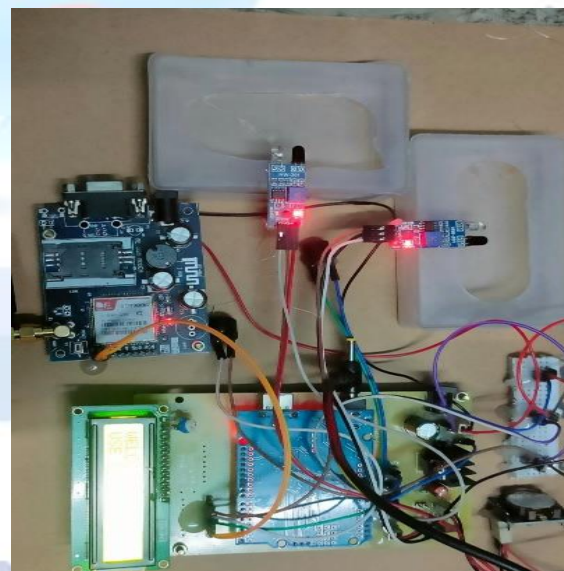


Fig. 1. Pill Box Subdivision

A. A. Medicine Box

Three box is divided into different equal boxes where each box contains and buzzer is fitted onto the top of the box. The pill box model is as shown in Fig. 1.

B. B.Arduino

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Arduino consists of both a physical programmable circuit

board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

C. C.LCD

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. In our project 16x4 LCD is used to display the information about pillbox such as the number of medicines in each sub-box to be consumed when the alarm rings.

D. D.GSM

GSM (Global System for Mobile Communications, originally Groups Special Mobile), is a standard developed by the European Telecommunications Standards Institute(ETSI).It was created to describe the protocols for second generation (2G) digital cellular networks used by mobile phones and is now the default global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories. The SIM900A module supports quad-band GSM/GPRS network, available for GPRS and SMS message data remote transmission.

E. E.Real Time Clock Module

Real Time Clock (RTC) module uses the DS1307 to keep track of the current year, month, day as well as the current time. It includes small lithium coin cell battery that will run the RTC and can be accessed via the I2C protocol. In our project it used to set a specific time as per the patient required i.e. if the user wants to set 8.00 am as its morning medicine taking time then they can do with the help of this module.

5. PROPOSED MODEL

The setup consists of a small box divided into multiple compartments, each having a lid to open and an IR sensor attached to it. The box is connected to a real time clock, a microcontroller device Arduino Uno which processes the activities and accordingly displays the pill details and time of intake on the LCD attached to the box and a GSM module which sends message to the family physician or members in case the pill is not taken. The box consists of several compartments each having a pill for a definite time of the day. An electronic real

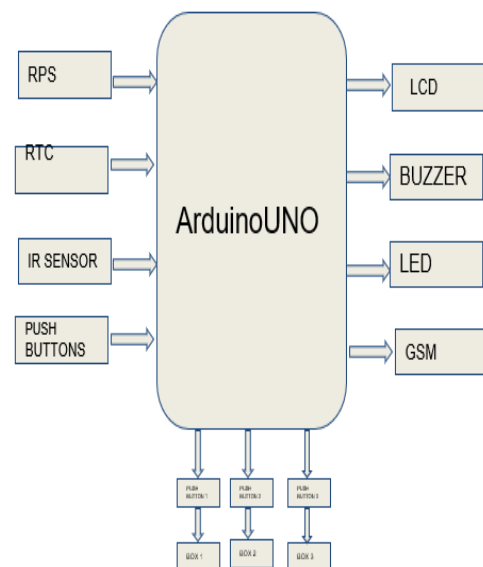


Fig. 2. Block Diagram of the Proposed Model

time clock, with factory predetermined time interval, automatically activated in sync with the pill intake timings. The real time clock will start beating and as it reaches the stipulated time of pill-intake, the buzzer will go on and message will be displayed regarding which pill to take and time to take each pill [7]-[8].

A pill reminder is any device that reminds users to take medications. Traditional pill reminders are pill containers with electric timers attached, which can be preset for certain times of the day to set off an alarm. More sophisticated pill reminders can also detect when they have been opened, and therefore when the user is away during the time they were supposed to take their medication, they will be reminded of it when they return. This reminder can be in the form of a light, which also helps for deaf or hearing-impaired users.

The pill dispenser may be preloaded by the patient himself or may be preloaded by someone assisting the patient once a day, thereby minimizing or totally eliminating the possible confusion as to when to take the prescribed medicine and what dosages to take.

a) Now if the person/user takes the pills, i.e. opens the lid, the IR Sensor attached to the lid will detect that the lid is opened and hence will send the output to Arduino which will stop the buzzer. This will be taken into the log registering the person has taken his medicine successfully.

b) In case the person fails to take the medicine or refuses to, the lid will not open and the buzzer will automatically stop after a preset time and will be put on snooze. If a person again misses the medicine, the output will be sent to the GSM module attached which in turn will send a message to the person reminding him that he has missed a pill. And if once again the person misses the pill, a message will be sent to family members.

A newer type of pill reminder is a mobile app that reminds the owner to take the medication. Some of these applications might effectively support adherence to taking medications. Pill organizer are useful for all types of patients, including the elderly, those who have memory deficiencies, and those taking multiple medications as an aid in remembering to take proper doses of their medications in compliance with their doctor's recommended dose. They allow a patient to know whether or not they have taken a particular dose of their medication; if a pill still remains in its compartment, it is apparent that it has not yet been taken, whereas if it is missing, it has already been taken.

Pills dispensers are items which release medication at specified times, to assist patients in adhering to their prescribed medication regime. They may also alert the patient that it is time to take the medication. Some devices can alert a monitoring station if the patient does not take the medication from the device promptly.

An on-demand pill reminder and tracker app not just help you monitor your medications, but also helps you monitor the health of your loved ones. You can track their medications and manage them at your end to remind them often to take the medicines on time. According to the research, nearly 60% of adults are moving towards technology to help them remind about

their medications. So, with medication tracking app development, you can launch a product that assists people to track diet, stress, sleep, physical activity, body weight, etc.

The block diagram of the proposed model, process flow, front and side view of the model are as shown in Fig.2, Fig.3, Fig. 4 and Fig. 5 respectively

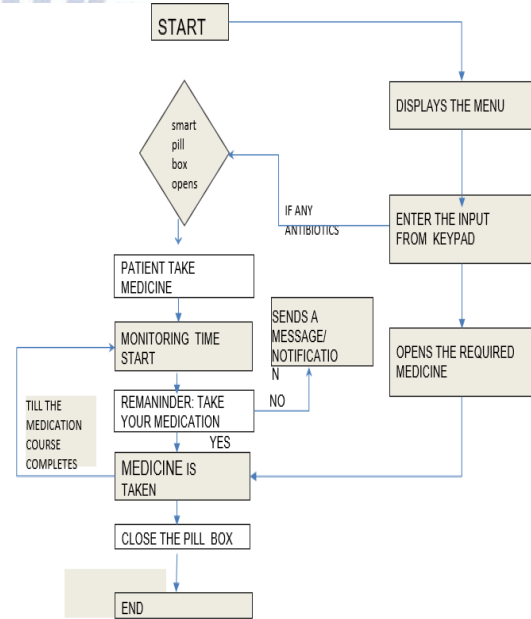


Fig. 3.Process Flow Schematic

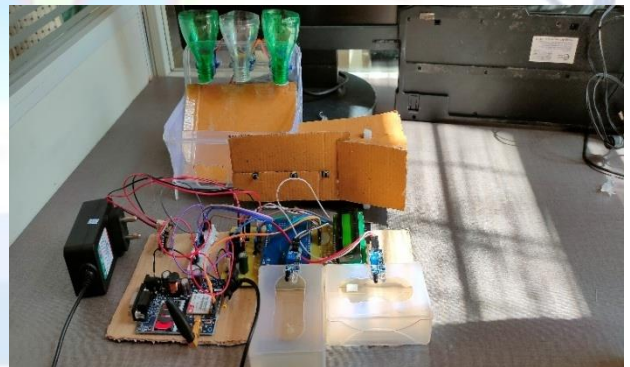


Fig. 4.Front End View of the Model

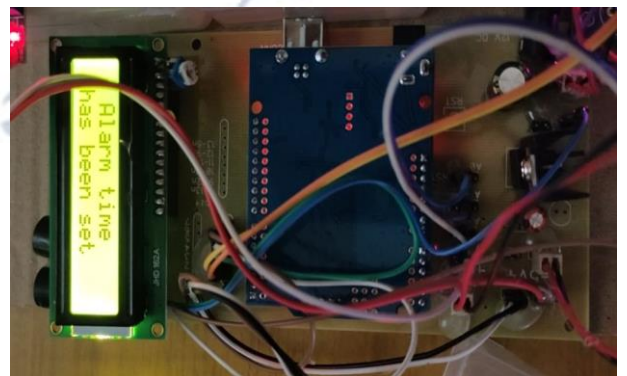


Fig. 5.Side View of the Model

6. RESULTS AND DISCUSSIONS

The device helps in keeping track of regular medical taking activities and reduces manual supervision and human effort. With simple circuitry and effort, the easy-to-use and cheap device comes as a boon for the young and the elderly, a simple solution for mothers for their adolescents, and caretakers for the aged and suffering. It can find its use in every household or hospital that has medical supervision problem and can be marketed as an efficient solution to us. The desired output results are shown in the Fig. 6 and Fig. 7.

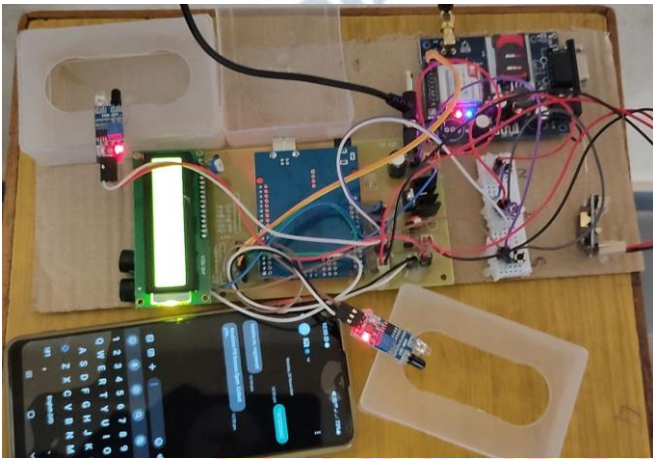


Fig. 6. Time to take the Medicine

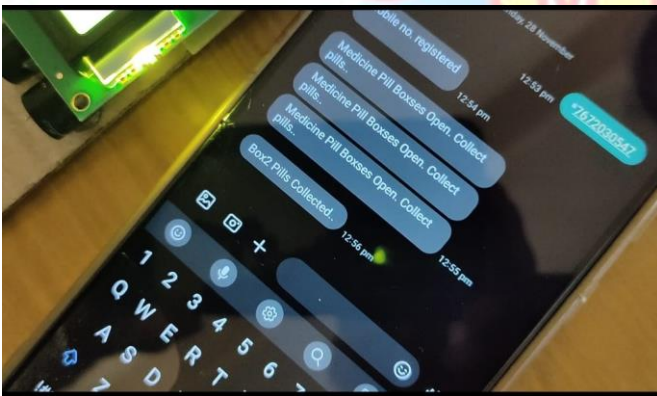


Fig. 7. Message If Pill Not Taken

7. CONCLUSION

The process of seeing a doctor for routine check-ups is a long time as well as a financial burden. So, to overcome this we introduce a smart first-aid kit which provides us with a temporary treatment. It is a kit in which all the types of medicines are available which can act as a self-treat through diseases like cold, cough and other few types of disease. Sometimes a situation occurs that a patient needs temporary treatment so at that time it can help him/her to relax for at least time in which he/her can

reach the nearest hospital. Different messaging and various reminding of medicine techniques have been reviewed. Now we have proposed such system which is very useful for older persons who suffered with chronic diseases like Diabetic and also different types of cancer and for pregnant women as well. This project, implemented using the Microcontroller and GSM module. By using this system Text message as well as Broadcast message or whatsapp message can be sent. By using the Raspberry Pi, there is scope to optimize different methodologies in reminding of medicines more users friendly and wide application areas. In future this system can be modified for showing the heart rate and also it will monitor the patient's condition with the help of sensors who continuously displays the patient's temperature and pulse rate.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

- [1] Shivashankar, Ravi, P Rajendra Prasad P, S Santosh Kumar and K N Sunil Kumar "Improvement of speed in data collection rate in tree based wireless sensor network", Proceedings of IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT), ISBN: 978-1-5090-0774-5, DOI:10.1109/RTEICT.2016.7807918, pp. 720-723, 2016.
- [2] Anand Vijay K M, Nisar Pasha S B, et al. An Improved Performance of Home E-health Portable Monitoring System. 2017 2nd IEEE International Conference On Recent Trends In Electronics Information & Communication Technology, May 19-20, 2017, India.
- [3] Park Set al, Real-time monitoring of patient on remote sites. Proceedings of the 20th annual international conference of IEEE EMBS, vol. 20, No.3; 1998.
- [4] Movable Patient Health Monitoring [ieeexplore.ieee.org / free abs_](http://ieeexplore.ieee.org/) all. number=5479388 Print ISBN: 978-1-4244-5162- 3 Issue Date: 30-31 May 2010.